

STUDENT:

TEACHER:

INFORMATION TECHNOLOGY: IT APPLICATIONS

Written examination

October 2015

Reading time: 15 minutes

Writing time: 2 hours

QUESTION AND ANSWER BOOK

Structure of book

Section	Number of questions	Number of questions to be answered	Number of marks
A	20	20	20
B	7	7	70
			Total 90

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and rulers.
- Students are **NOT** permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.
- No calculator is allowed in this examination.

Materials

- Question and answer book of 18 pages.
- Detachable answer sheet for multiple choice questions. You may remove this during reading time.

Instructions

- Write your **name** in the space provided above **and** on the multiple choice answer sheet.
- All written responses must be in English.

At the end of the examination

- Place the answer sheet for multiple choice questions inside the front cover of this book.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

SECTION A – Multiple choice questions**Instructions for Section A**

Answer **all** questions in pencil on the answer sheet for multiple-choice questions.
Choose the response that is **correct** or that **best answers** the question.
A correct answer scores 1, an incorrect answer scores 0.
Marks will **not** be deducted for incorrect answers.
No marks will be given if more than one answer is completed for any question.

Question 1

A non-technical constraint on a website solution would be

- A. page loading time.
- B. encryption needs.
- C. the requirements of human rights legislation.
- D. browser compatibility.

Question 2

Pedro Caramba was using a Macintosh Air computer to read a colleague's Microsoft Word document to find sentences that did not make logical sense. Pedro was doing

- A. manual testing.
- B. electronic evaluation.
- C. electronic testing.
- D. manual validation

Question 3

The structure of a relational database management system (RDBMS) consists of

- A. records, which contain fields, which contain formulas, data or labels.
- B. tables, records, and fields.
- C. queries, data, relationships and data types.
- D. tables, data dictionaries, and algorithms.

Question 4

Barry's Bonza Bagpipes is a small company in Melbourne that makes and sells noisy Scottish musical instruments. Barry, the owner, mainly wants his company to make a profit. He plans to achieve this by creating a website that will attract new customers. One day he decides to offer a '10% off all prices' sale on the website.

- A. Profit is an organisational goal, and the 10% off sale is a tactical decision.
- B. Attracting new customers is an organisational goal, and the sale is a strategic decision.
- C. Attracting new customers is an operational decision.
- D. Profit is a system goal of the website, and creating the website is an operational decision.

Question 5

To connect an average home or office computer to the internet it **must** have

- A. a router.
- B. a web browser.
- C. a modem.
- D. a network operating system.

Question 6

A disadvantage of backing up data to the cloud is that

- A. the data is not stored offsite.
- B. data can be slow to upload using an ADSL connection.
- C. you must use a slow 3G or Wifi connection to reach the cloud.
- D. viruses can enter your computer through the cloud connection.

Question 7

Betty's Banjo Boutique last year turned over \$4.2 million dollars. The Melbourne company has been so successful that they recently sold their old office computers and replaced them with faster new machines. Unfortunately, no-one remembered to re-format the old computers' hard disks, which stored all of their customers' credit card information. This information was soon being misused in hundreds of fraudulent purchases.

The source of the information leak was soon traced to Betty's company. The consequences of Betty's negligence could possibly include

- A. prosecution under the *Information Privacy Act*.
- B. prosecution under the *Charter of Human Rights and Responsibilities Act*.
- C. no prosecution, but possible damage to her company's public reputation.
- D. prosecution under the *Privacy Act*.

Use the following information for questions 8 – 13

Just for fun, Randall decides to create a relational database to store data about his collection of antique soft cushions. At one point he creates a key field called ID and specifies its data type as number. He enters some records, and types these values into the ID fields: 0010, 0001, 0009. He then sorts the records in descending order based on the values in the ID field.

Question 8

The sorted list of records would appear in this order and with this appearance:

- A. 10, 9, 1
- B. 0010, 0009, 0001
- C. 0001, 0009, 0010
- D. 1,9,10

Question 9

To be relational, Randall's database needed to have at least two

- A. records.
- B. key fields.
- C. foreign keys.
- D. tables.

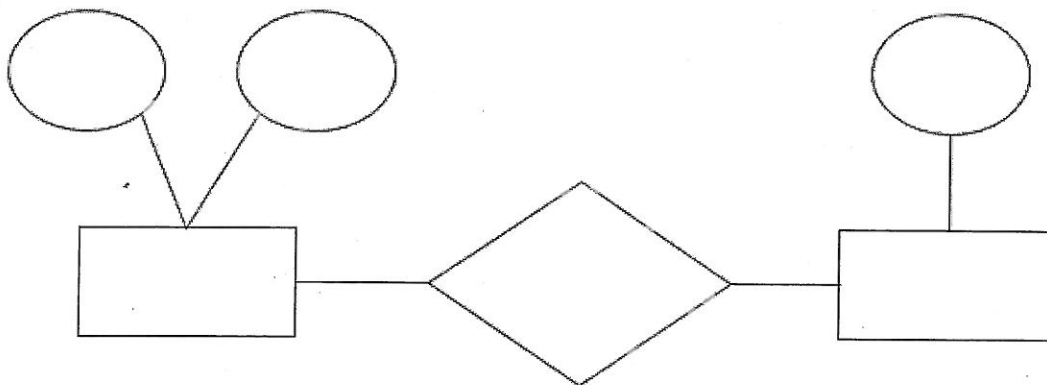
Question 10

Randall needs a field to store the size of each cushion. He should

- A. make it a text field so it can contain extra information like "24cm".
- B. call the field "Antique Cushion Size (centimetres)" and make the field value compulsory.
- C. make it a number field called "Size".
- D. use naming conventions such as Hungarian Case and Camel Notation.

Question 11

Randall creates this diagram.



- A. The circles indicate processes.
- B. The diamond shape could be labelled "Cushions".
- C. Either of the rectangles could be labelled "Contains"
- D. One of the circles could be labelled "ID".

Question 12

Randall creates a query to find all cushions that were made in Australia and are at least 20cm wide but no larger than 30cm. The most appropriate query statement would be

- A. `ORIGIN = "Australia" AND WIDTH >= "20cm" AND WIDTH <= "30cm"`
- B. `ORIGIN = "Australia" AND WIDTH <= 20 AND WIDTH >= 30`
- C. `ORIGIN = "Australia" AND WIDTH >= 20 AND WIDTH <= 30`
- D. `"ORIGIN" = Australia AND "WIDTH" = 20 TO 30`

Question 13

Randall bought his desktop computer in 2015. Its specifications might include

- A. 1 Terabyte of RAM (Random Access Memory).
- B. 4 Gigabytes of RAM.
- C. A hard disk with a capacity of 40 Gigabytes.
- D. An Ethernet operating system.

Question 14

Lucy Fang, owner of Fang Solutions, is creating an IPO (Input-Process-Output) chart. She may be

- A. analysing a website.
- B. evaluating a spreadsheet.
- C. developing a data dictionary.
- D. designing a database.

Question 15

Bruce asks his wife Kylie to try out a website he has just finished building. He asks her to find out how easy it is to read the website's information. Kylie is

- A. testing the website's effectiveness.
- B. validating the website's efficiency.
- C. evaluating the website's effectiveness.
- D. analysing the website's efficiency.

Question 16

Sayuri produced a database that included a field containing people's dates of birth. The same date appeared as "3 Dec 2015" in one printout and "2015-12-03" in another. The difference was most likely caused by

- A. the field's data type.
- B. the field's formatting.
- C. a failure of data integrity.
- D. a requirement of the 'Transborder Data Flows' National Privacy Principle.

Question 17

When setting up a website on a web server, the server would probably need

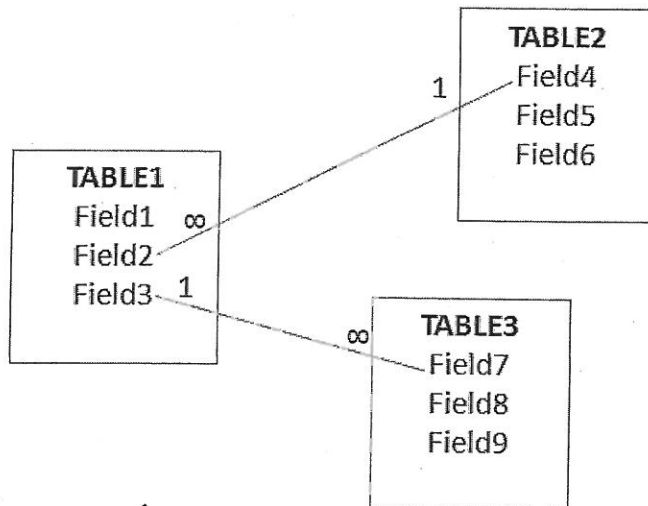
- A. TCP/IP protocols for internet communication.
- B. FTP (Firewall Transparency Protocol) to detect attempts to bypass the server's security.
- C. POP or IMAP protocols for protection against pop-up ads and other adware.
- D. HTTP for encryption of web traffic.

Question 18

Sabrina wants to learn how to use her new video editing software. It would be best for her to use

- A. a quick start guide
- B. a tutorial
- C. a user manual
- D. context-sensitive help

Question 19



From this diagram, knowing that "∞" means "many", we can be sure that

- A. Field2 and Field3 are primary key fields.
- B. The same value can appear in Field4 in many records.
- C. TABLE1 could be called 'CUSTOMERS' and TABLE3 could contain a history of past sales.
- D. Field3 and Field7 must have the same name.

Question 20

Walter is the manager of an ICT project funded by the Victorian state government. Walter believes a member of his team is using a company email account to send offensive messages to another team member. To identify the person responsible, Walter asks the network manager to give him copies of all emails sent by project members using company email accounts. This request is probably

- A. not unethical because all emails sent using a company email account should be work-related.
- B. illegal because of the *Information Privacy Act*.
- C. an ethical dilemma because the need for email privacy must be balanced against protecting team members from abuse.
- D. illegal because email authors own the copyright of their emails under the *Copyright Act*.

SECTION B – Short answer questions**Instructions for Section B**

Answer all questions in the spaces provided

Question 1 (9 marks)

In **two** stages of the problem-solving methodology (PSM), the makers of a website used a stopwatch to measure how long it took for a webpage to fully load in a browser.

- a. Name these two stages of the PSM. 2 marks

- b. In each of the two stages, the makers had different reasons for measuring the page's loading speed. Explain the difference between these two reasons. 2 marks

- c. As they worked on this website, the team wanted to evaluate the efficiency and effectiveness of the site. During which stage of the PSM were the evaluation criteria decided upon? 1 mark

- d. Name an effectiveness criterion and describe a method they could have used to evaluate it. 2 marks

- e. Name an efficiency criterion and describe a method they could have used to evaluate it. 2 marks

Question 2 (4 marks)

Eddie Codd, a database student, creates this data entry form interface.

- a. Suggest **four** improvements that could be made to the interface. Do not give the same improvement more than once.

[illegible]

Question 3 (4 marks)

Database engineer Dennis Rader is under pressure from his boss to finish a database quickly for their client, *West Websites*. The database is weeks behind schedule and further delays will cost Dennis' company dearly because until the database is finished, they cannot accept any new profitable jobs. Dennis tells his boss that he needs just three more days to write and test the database's security code. The boss says, 'Finish it and ship it today, Dennis, or find yourself another job'.

With one hour to go until the end of the day, Dennis starts to panic. He could deliver the database to the client with incomplete security and hope no-one tries to break into the database before he gets a chance to fix it up properly in a few weeks. Or he could confess to the client, explain the security problem and let the client decide what to do.

- a. What is Dennis' ethical dilemma?

2 marks

- g. Apart from finishing the database on time, how could Dennis' painful situation have been prevented?

2 marks

a. Jacques le Ripeur, newly arrived from the tropical paradise of Martinique in the Caribbean, sets up a small business in Geelong that specialises in farming and selling escargots (snails) to chefs across Victoria. He sets up a local area network for his staff – Mary, Annie and Elizabeth – who are competent typists, but are not very skilled in managing files and they have little understanding of computers or the internet. Jacques and the women all have unlimited access to all of the data on the file server using the same password (which is ‘password’ because – as Jacques says with a smile – ‘No-one would think of *that*’).

Because Jacques is worried about security, he instructs his workers to delete files securely by dragging them into the Microsoft Windows XP recycling bin. Trash paper, including drafts of secret and valuable snail recipes, is put in a waste paper basket and later taken to the tip. Jacques backs up his data every week to protect it. He copies data to a 1 GB flash drive which he stores in the office safe. His data disaster plan consists of a hand-drawn map of the office with the door highlighted in yellow to indicate the emergency escape route. The office was excited recently when Elizabeth_h announced she found out she was the millionth visitor to a website and had claimed her prize by clicking a link in the congratulatory email.

8 marks

This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- b. Jacques le Ripeur discovers one day that he is a descendant of the notorious serial killer, Jack the Ripper, who apparently fled to Martinique to escape the London police in about 1891! Jacques decides to create a type of website in which he can announce his findings and feelings about this shocking discovery. What type of website would best serve Jacques' needs?

1 mark

Question 5 (10 marks)

Kahlil is designing a relational database for a company. So far he has sketched out this structure of the *Employees* table with some sample data:

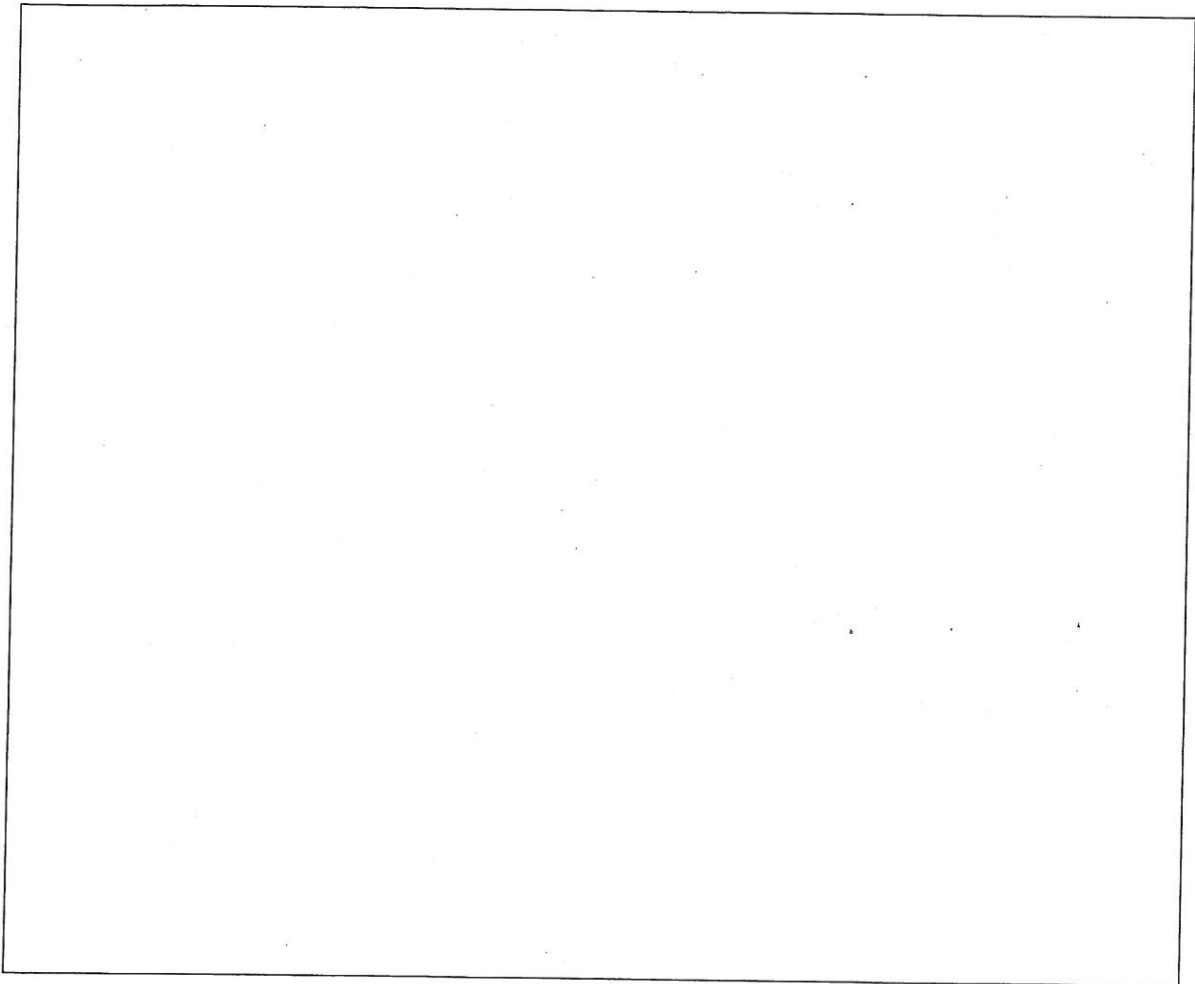
EMPLOYEES_TABLE							
FirstName	FamilyName	DeptID	DeptBossName1	DeptBossName2	DOB	txtPhone1	txtPhone2
Fred	North	Sales	Edmund	Kemper	29/9/1941	9485 3894	
Myra	Herd	Accounts	Nanny	Doss	25/7/1942	9374 3485	9182 3945

- a. Kahlil soon realises that his proposed database structure has not even achieved first normal form (1NF). What evidence is there that he has not achieved 1NF? 1 mark

- b. Describe the benefits for Kahlil of achieving 1NF. 2 marks

- c. Kahlil successfully modifies his database to achieve 1NF. He knows that no department has two people with the same full name, so he decides that the primary key should consist of those three fields: FirstName + FamilyName + DeptID. He then notices that he has not achieved second normal form (2NF). Explain how he knows that he has not reached 2NF. 2 marks

- d. Sketch a modified database structure – including necessary relationships with cardinality (e.g. “1:many”) – that would satisfy 2NF. You may leave out the modifications needed to achieve 1NF. 3 marks



- e. Identify **two** naming conventions Khalil used for objects in his database and explain their benefits. 2 marks

Question 6 (20 marks)

Harry's Hardware is a small hardware shop in Melbourne owned by Harry Hammer, who is keen to make more money and become famous in the world of hardware. Harry's daughter, Harriet, suggests he create a website and set up online ordering. Harry is not sure, so Harriet must convince him.

- a. Give **two** arguments Harriet could use to convince her father to create the website. 2 marks

Argument 1

Argument 2

- b. Harry agrees to create the site, and Harriet begins her analysis.
Explain why she begins with analysis and does not immediately start to design the site. 2 marks

- c. What is one requirement that Harry will probably want his website to be able to do? 1 mark

- d. What is one quality or attribute that Harry will probably want his website to have? 1 mark

- e. Harriet begins to design the new site. She knows she needs to show her father the planned structure and appearance of the site: Name the design tools she would find useful for these purposes. 2 marks

Structure

Appearance

f. Harry tells his daughter what his shop currently provides to customers:

- Information about tools, made up of hand tools (hammers, screwdrivers, and chisels) and power tools (circular saws, routers, and angle grinders)
- Advice on how to use hardware tools
- A place where customers can chat about hardware.
- A display board covered with photos of happy customers and their families using Harry's tools.
- Long discussion about the performance of the St Kilda Football Club in recent years.

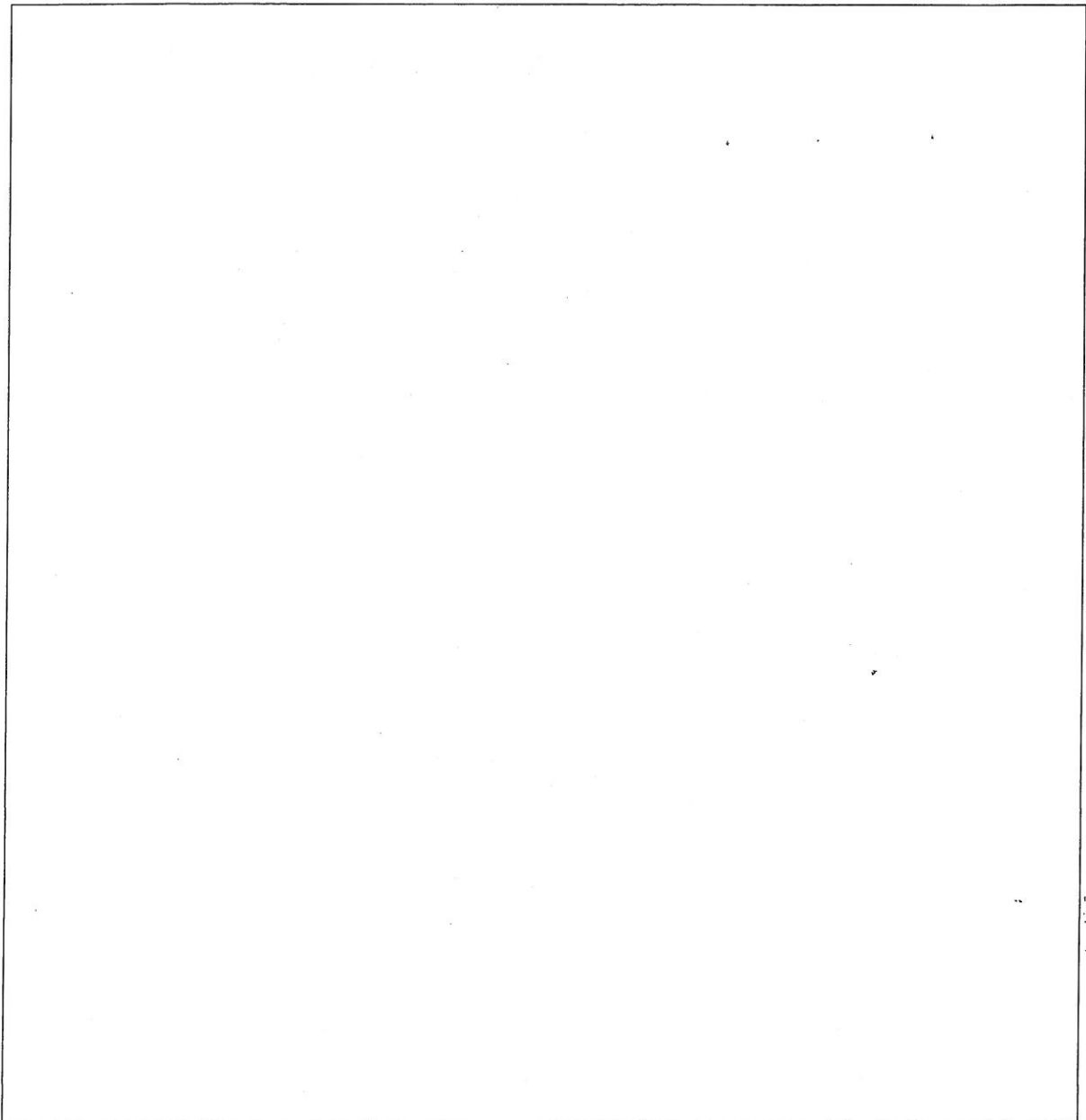
Harry wants his website to provide similar services, where appropriate, for his online customers.

Harriet adds that the site would also need

- one extra page to satisfy the *Australian Privacy Act 1988*, and
- another page that most visitors would expect to find in any website.

In the space below, use an appropriate tool to show the design of the website's structure, including the complete file names of all web pages.

7 marks



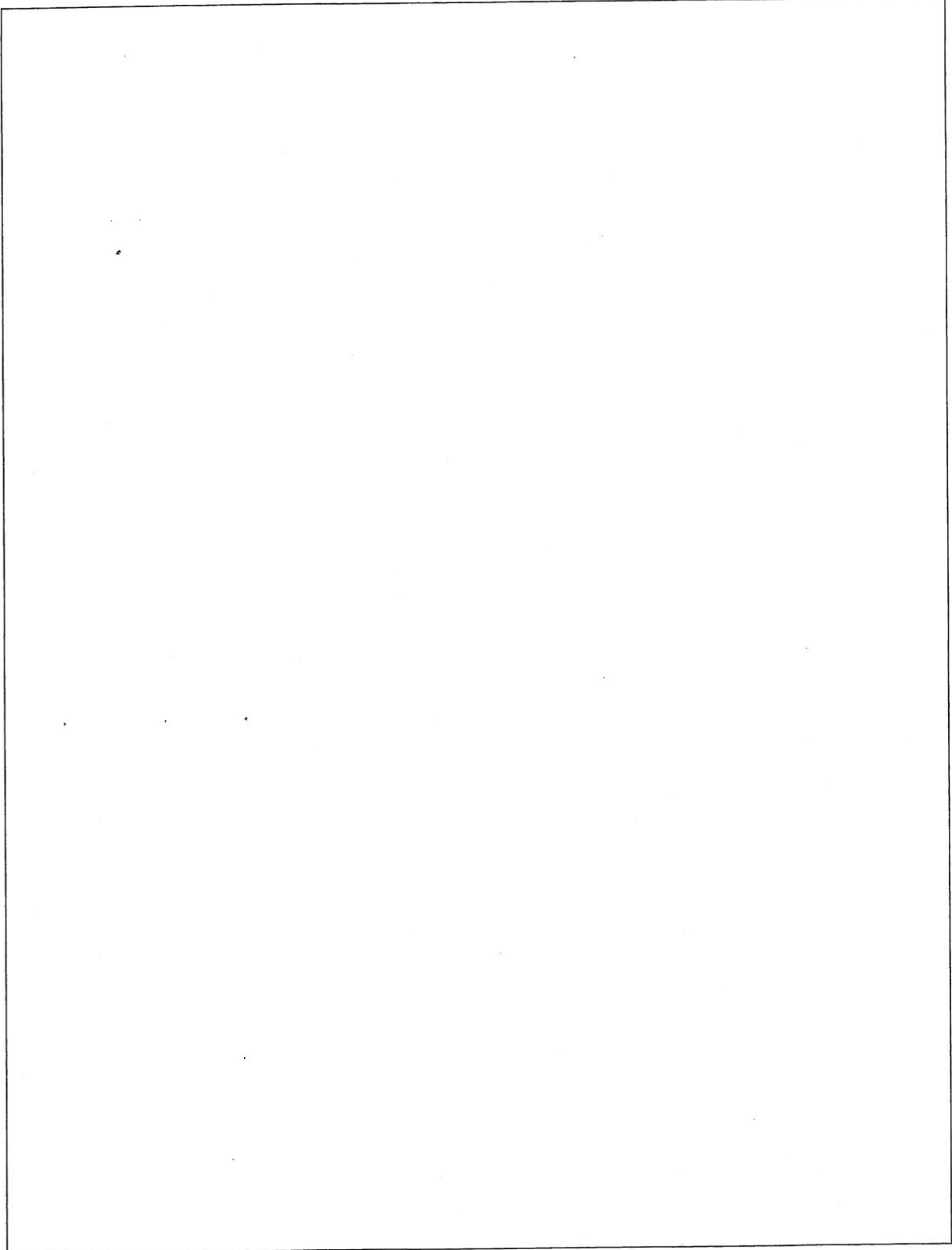
CSE 2015 IT-APP EXAM

- g. Harriet then uses a tool to design the appearance of the site's homepage.

Show this design and add notes to it showing how each of the following design elements has been demonstrated.

- load time
- relevance
- proportion
- consistency
- contrast

5 marks

A large empty rectangular box with a thin black border, intended for the student to draw a design and add notes demonstrating the specified design elements.

Question 7 (14 marks)

Tom Berners-Lee called for help from his big brother Tim, who knows a thing or two about the internet. Tom explained that he got a job creating a solution that can calculate and print pay cheques for a company's 1,000 employees. The solution has to be easy to use and accurate. It needs to be able to print cheques and pay advice summaries for each employee and, it has to be able to produce weekly pay summaries for the employer.

- a. Tom says to his brother, 'First thing, Bro! I want to see a nice, neat, logical list of all males in the transport department. What I need to do to get that?' Explain what Tom should do using either a spreadsheet or relational database management system (RDBMS).

Circle one software type to which your answer relates – spreadsheet or RDBMS.

2 marks

- b. Tom explains that he needs to calculate tax deductions based on employees' salaries so he can work out their take-home pay. As a simple example, he proposes the following tax scales:

Weekly Salary range	Tax Rate
\$0 - \$200	0%
\$201 - \$550	15%
\$551 and above	33%

Create a set of test data that would most thoroughly, effectively and efficiently test the accuracy of a formula that calculates take-home pay based on pre-tax salary.

3 marks

- c. With reference to the same software specified in question a. above, explain in writing and/or diagrams how Tom's solution could efficiently decide which tax rate to apply to any employee's salary.

4 marks

d. Tom explains to Tim the formula for calculating net pay (after tax) from gross pay (before tax) using the following as an example:

- Employee X earns \$300 gross pay (pre-tax).
According to the table, in **b.** above, the tax rate for \$300 is 15%.
- Fifteen percent of \$300 (0.15 multiplied by 300) is \$45. That is the tax amount.
- Net pay is gross pay (300) minus the tax amount (45) – so employee X takes home \$255.

In the space below, create an input-process-output (IPO) chart to design the calculation of Net Pay.

3 marks

e. Just before he is fired, Tom decides to try to help out his buddies in the sales department. He creates a formula that adds \$50 to the net pay if an employee's *Gender* is male and the employee's *Department* is sales. Using the correct syntax of the spreadsheet or database you used this year, write the formula that would achieve what Tom wanted.

2 marks
